

REMARKS

This Response is submitted in reply to a final Office Action mailed on May 14, 2008. Claim 6-21 are currently pending. Claims 6-15 stand rejected under 35 U.S.C. §103(a). In response, Applicants have amended claims 6 and 12 to incorporate dependent claims 11 and 15, respectively. No fee is due in connection with this Response. The Director is authorized to charge any fees which may be required, or to credit any overpayment to Deposit Account No. 02-1818. If such a withdrawal is made, please indicate the Attorney Docket No. 112857-424 on the account statement

On January 28, 2008, Applicants filed a Supplemental Response to our Response to Office Action filed on January 25, 2006. In that Supplemental Response, claims 16-21 listed above were added to the response. Based on the current Office Action, Applicants presume that the Examiner has not considered those additional claims, and therefore respectfully request that the Examiner do so.

In the Office Action, claims 6-9, 11-13, and 15 are rejected under §103(a) as being unpatentable over JP 2002-075368 ("*Yamamura*") in view of WO 00/02280, using U.S. Patent No. 6,824,924 as an English translation ("*Kurose*"). These rejections are moot in view of the amendments to claims 6 and 12. Claims 6 is directed to a positive active material, whereas claims 12 is directed to a non-aqueous electrolyte secondary battery. Common to both claims 6 and 12, a lithium nickelate formula is recited where M' is selected from the group consisting of Fe, Mn, Cu, Zn, Sn, Ga, Cr, V, Ti, Mg, Ca, Sr, and mixtures thereof. Both 6 and 12 also require the limitation that the content of the olivine compound in the positive active material range from about 5 wt % to about 50 wt%. Claims 9 and 13 further specify that the lithium nickelate is LiNiO_2 . Moreover, claims 10 and 14 recite that the olivine compound is LiMnPO_4 .

In contrast, *Yamamura* discloses a battery with an anode material of the general formula $\text{LiNi}_{1-x}\text{M}_x\text{O}_2$, where M is at least one of Al, B, Co. This is clearly different from the nickelate compound as claimed in claims 6 and 12, and as further defined in claims 9 and 13. Moreover, *Yamamura* is further directed to the general formula LiFePO_4 in contrast to the olivine compound of the claimed invention.

The Examiner asserts several arguments across claims 6-9, 11-13 and 15. The arguments focus first on *Yamamura* and then on *Kurose*, so the Applicants' response will mirror those

assertions. Firstly, with regard to claims 6 and 12, the Examiner asserts that the material in *Yamamura*, LiFePO_4 is inherently of olivine structure. In support of this argument, the Examiner notes MPEP 2112.02(II) for the premise that products of identical composition cannot have mutually exclusive properties. Applicants respectfully disagree with the Examiner's application of this rule to crystalline inorganic compounds. As one of ordinary skill would recognize, the same chemical formula, especially with regard to inorganic compounds, can have multiple crystalline forms, e.g. rhombic, orthogonal, monoclinic, olivine, etc. Those crystalline forms can change many aspects of the compound's reactivity. As a simple and relevant example, inorganic compounds in different crystal structures could have different densities and lattice volumes. More specifically, lithium's ability to interact with a crystalline form changes with each form's ability to bind and release lithium. For this reason, Applicants respectfully disagree with the application of this rule. *Yamamura* is silent on which, if any, crystalline form is present in its disclosure.

In addition, the Examiner asserts that *Yamamura*'s disclosure of $\text{LiNi}_{1-x}\text{M}_x\text{O}_2$ particles with a median size of 11.458 μm and LiFePO_4 particles with a median size of 0.185 μm meets the limitations present in claims 7 and 8. Applicants respectfully disagree. Applicant's first note that claim 8 contains a limitation directed to the thickness of the olivine compound on the nickelate of 0.1 μm to about 10 μm . Nothing in *Yamamura* discloses any information as to the LiFePO_4 layer. The Examiner seems to assert that a starting material with the disclosed median size meets this limitation, but provides no basis for that assertion, and no citation in support of that conclusion. As for claim 7, the Examiner has no basis for asserting that median particle sizes of 11.458 μm for a starting material containing Al, B, or Co meets the claimed limitation of a final product with a core and shell, where the core of the claimed product does not contain the elements B, Al, or Co. Effectively the Examiner is asserting that a starting material A of X size is the same as a final product containing a core B with Y size. There is no basis for this conclusion, particularly considering that the compounds are not the same.

The Examiner also asserts that *Yamamura*'s disclosure teaches the limitations present in claims 11 and 15 of 5-50% weight olivine compound in the positive active material. Note that this limitation has been incorporated into the respective independent claims. Applicants respectfully disagree with this rejection. *Yamamura* contains no disclosure for ranges of olivine compound in the positive active material. The Examiner asserts that the claimed range

represents only an optimum value of a result effective variable that involves routine skill in the art. This argument, however, must fail, because it is in clear contravention to the disclosure in *Yamamura*. The only disclosure of amount of olivine compound in the positive active material is in paragraph [0054] which discloses the reaction of 1 g of nickelate and 30 g of LiFePO_4 . Note that this is 96.8 percent weight LiFePO_4 . (30g/31g). This value is not remotely close to the top end of the claimed limitation of about 5 wt % to about 50 wt%. The disparity between these two values, and the complete lack on any disclosure in *Yamamura* as to the ratio of components, leads to the opposite conclusion that the Examiner is setting forth here. *Yamamura* actually teaches away from the claimed invention because it, at best, suggests that LiFePO_4 should be present in a larger amount than the nickelate.

After addressing *Yamamura*, Examiner recognizes that it fails to disclose the lithium nickelate compound of claims 6 or 12, as well as claims 9 and 13. To overcome this deficiency, the Examiner asserts that *Kurose* supplies this limitation. Applicants respectfully assert that the combination of *Kurose* and *Yamamura* does not teach the claimed invention, is improper, and even if properly combinable would teach away from the invention.

Applicants note that *Kurose* does not teach the claimed invention. *Kurose* does not disclose an olivine compound, so it does not remedy the deficiency in *Yamamura* of about 5 wt% to about 50 wt% olivine compound in the positive active layer. For this reason alone, the claimed invention is non-obvious over *Kurose* and *Yamamura*.

Applicants also note that the rejections of claims 7 and 8 relied on specific sizes of a lithium nickelate that do not fall within the claimed invention. Therefore, it would be improper for the Examiner to assert that the substitution of one chemical structure for a different chemical structure would yield a material with the same size characteristics.

Moreover, the references are not properly combinable or would teach away from the invention. *Yamamura* teaches a combination of two metal compounds, the nickelate and LiFePO_4 , with the LiFePO_4 covering the faces of the nickelate. In contrast, *Kurose* teaches the use of a crushed expanded graphite as a conductive agent to increase the performance of the active material. That active material can be a variety of lithium composite oxides. Therefore, the two cathode active materials have fundamentally different properties. The Examiner asserts that they could be combined because both references teach reduction in size and weight of the battery, leading to an increase in energy density. Specifically, the Examiner asserts that one of

ordinary skill would “look to the teachings of *Kurose* suggesting the use of LiNiO_2 as a positive electrode active material in the battery of *Yamamura* ...since the substitution ...would result in a reduction in size and weight, leading to an increased in energy density.” The problem with that assertion is the two references achieve that goal by completely different routes. *Kurose* does not achieve better energy density because of LiNiO_2 . The clear teachings of *Kurose* is the use of crushed expanded graphite to achieve that result. In reality the combination of *Kurose* and *Yamamura* would be to use crushed expanded graphite in combination with the cathode active materials that are at the heart of *Yamamura*’s invention. This would fail to make the claimed invention obvious.

For these reasons, Applicants respectfully submit that the combination of *Yamamura* and *Kurose* does not make obvious the current set of claims, and thus believe that the present application is in condition for allowance in view of same.

In the Office Action, claims 10 and 14 stand rejected under §103(a) as obvious in view of the combination of *Yamamura* and *Kurose*, and further in view of U.S. Patent No. 6,391,493 (“*Goodenough*”). The Examiner relies on *Goodenough* for the limitation of olivine compounds of the formula LiMnPO_4 . Applicants note that nothing in *Goodenough* teaches adding the olivine compounds to another metal oxide, particularly a lithium nickelate of the claimed invention, and does not teach a ratio of about 5 wt% to about 50 wt % olivine compound to nickelate compound. For this reason alone, it does not remedy the deficiencies of *Yamamura* and *Kurose* discussed above. Furthermore, the Examiner uses the combination of three references to reach claims 10 and 14, and improperly relies on the teachings in the Applicants’ specification to reach the appropriate combination of elements. For these reasons, Applicants request that the rejections of claims 10 and 14 be withdrawn.

For the foregoing reasons, Applicants respectfully submit that the present application is in condition for allowance and earnestly solicit reconsideration of same.

Respectfully submitted,

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